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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/681,040	10/07/2003	Pawel Czubarow	1035-O4280	2721
34456	7590	02/27/2006	EXAMINER	
TOLER & LARSON & ABEL L.L.P. 5000 PLAZA ON THE LAKE STE 265 AUSTIN, TX 78746			KRUER, KEVIN R	
			ART UNIT	PAPER NUMBER
			1773	

DATE MAILED: 02/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/681,040

Applicant(s)

CZUBAROW ET AL.

Examiner

Kevin R. Kruer

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13, 16-31, 33-36, 38-42 and 51-53 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13, 16-31, 33-36, 38-42 and 51-53 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 21, 2005 has been entered.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Claims 1-13, 16, 17, 21, 23-31, 33-36, 38, 40-42 and 51-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,391,442 (herein referred to as "Duvall") in view of WO 03/004580 (herein referred to as Yamazaki).

Duvall teaches a thermal interface material that is to be provided between a heat sink and a heat source. The interface material includes thermally conductive filler particles dispersed in a phase change material. The phase change material softens and flows at the operating temperature of the heat source, thereby providing good thermal contact with uneven surfaces of the heat source and heat sink. The phase change material includes a polymer component and a melting point component, which adjusts the softening temperature of the phase change material to the operating temperature of the heat source (abstract). The composition may further comprise

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wetting agents, herein understood to read on the claimed "surfactant." (col 7, lines 4+).

The phase change material is preferably wax or a wax like material such as 2-{2-{2-(2-hydroxyethoxy) ethoxy}ethoxy} ethyl ester (herein relied upon to read on the claimed hydroxylated wax of claim 3) (col 6, lines 11+). The wax is included in amounts of 10-80wt% preferably 20-60wt% (col 6, lines 60+) and has a melting point of 30-120°C (col 5, lines 46+). The polymer component may comprise acrylic polymers or silicone polymers (col 6, lines 1+) and is included in amounts of 10-70wt% (col 6, lines 61+).

The conductive particle may comprise boron nitride (col 5, lines 28+) and is included in amounts of 10-80wt% of the material (col 6, lines 61+).

The heat source is herein understood to read on the claimed "conductive film" of claim 36 and the protective release film is herein understood to read on the claimed "protective barrier" of claim 41 (col 4, lines 7+).

Duvall teaches the composition may comprise a wax does not teach that at least 7wt% of an alkanolamide may be utilized as said wax. However, Yamazaki teaches a thermoconductive composition comprising (a) 100 parts by weight wax, (b) 10-1,000pbw of a polymer of formula (I), (c) 10-2,000pbw thermoconductive filler, and (d) 0-1,000pbw of a softener (abstract). The wax may comprise a fatty acid amide (page 3, lines 31+) such as stearic amide-herein relied upon to read on the claimed alkanolamide. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a fatty acid amide in a blend with the wax taught in the primary reference. The motivation for doing so would have been that said fatty acid amide is functionally equivalent to the wax taught therein. The courts have held that it is prima

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facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose in order to form a third composition to be used for the very same purpose. The idea of combining them flows logically from their having been individually taught in the prior art.

Further, it would have been obvious to utilize cocamide as the fatty acid amide because cocamide is a known fatty acid amide and said genus is small enough to anticipate the species included therein.

With regard to the claimed wetting angle of claims 50-52, it is known in the art that the amount of surfactant/alkanolamide utilized is proportional to the wetting angle of the composition. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the amount of surfactant added to the thermal interface composition in order to optimize the composition's wetting angle.

Furthermore, the examiner takes the position that the claimed "thermal impedance of "less than or equal to 0.8x" is inherent to a composition with the claimed wetting angle since the surfactant insures homogeneous dispersion of the conductive particles.

Duvall does not teach the claimed thermal impedance. However, Duvall teaches that the thermal conductance of the composition may be controlled by selecting the particle size, particle distribution, and filler loading concentration of the conductive particle (col 5, lines 40+). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the conductive particle's size, distribution, and concentration in order to obtain the desired thermal impedance.

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4. Claims 1-13, 16-31, 33-36, 38-42, and 51-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,391,442 (herein referred to as "Duvall") in view of EP 0794,227 (herein referred to as Hill).

Duvall teaches a thermal interface material that is to be provided between a heat sink and a heat source. The interface material includes thermally conductive filler particles dispersed in a phase change material. The phase change material softens and flows at the operating temperature of the heat source, thereby providing good thermal contact with uneven surfaces of the heat source and heat sink. The phase change material includes a polymer component and a melting point component, which adjusts the softening temperature of the phase change material to the operating temperature of the heat source (abstract). The composition may further comprise wetting agents, herein understood to read on the claimed "surfactant." (col 7, lines 4+). The phase change material is preferably wax or a wax like material such as 2-{2-{2-(2-hydroxyethoxy) ethoxy}ethoxy} ethyl ester (herein relied upon to read on the claimed hydroxylated wax of claim 3) (col 6, lines 11+). The wax is included in amounts of 10-80wt% preferably 20-60wt% (col 6, lines 60+) and has a melting point of 30-120°C (col 5, lines 46+). The polymer component may comprise acrylic polymers or silicone polymers (col 6, lines 1+) and is included in amounts of 10-70wt% (col 6, lines 61+). The conductive particle may comprise boron nitride (col 5, lines 28+) and is included in amounts of 10-80wt% of the material (col 6, lines 61+).

The heat source is herein understood to read on the claimed "conductive film" of claim 36 and the protective release film is herein understood to read on the claimed "protective barrier" of claim 41 (col 4, lines 7+).

Duvall is relied upon as above, but does not teach that the composition should further comprise at least 7wt% of a nonionic surfactant. However, Hill teaches a thermoconductive composition comprising a boron nitride particle and a polymer base material (abstract). Hill teaches the composition should further comprise nonionic surfactants selected from the class of carboxylic acid amides and carboxylic acid esters (abstract) in order to provide the material with flow (page 1, lines 45+). The surfactant is included in amounts of greater than 1% (claim 1). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add more than 1wt% nonionic surfactants to the composition taught in the primary reference. The motivation for doing so would have been that nonionic surfactants improve the flow of thermoconductive compositions.

Further, it would have been obvious to utilize cocamide as the fatty acid amide because cocamide is a known fatty acid amide. It also would have been obvious to utilize a glycerin derivative as the carboxylic acid ester because glycerin derivatives are known carboxylic acid ester. Said genres are small enough to anticipate the species included therein. Furthermore, cocamide and glycerin derivatives are known non-ionic surfactant.

With regard to the claimed wetting angle of claims 51-52, it is known in the art that the amount of surfactant utilized is proportional to the wetting angle of the composition. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the amount of surfactant added to the thermal interface composition in order to optimize the composition's wetting angle.

Furthermore, the examiner takes the position that the claimed "thermal impedance of "less than or equal to 0.8x" is inherent to a composition with the claimed wetting angle since the surfactant insures homogeneous dispersion of the conductive particles.

Duvall does not teach the claimed thermal impedance. However, Duvall teaches that the thermal conductance of the composition may be controlled by selecting the particle size, particle distribution, and filler loading concentration of the conductive particle (col 5, lines 40+). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the conductive particle's size, distribution, and concentration in order to obtain the desired thermal impedance.

5. Claims 1, 2, 6, 7, 10-13, 16-23, 25, 27, 28, 30, 31, 33-36, 38-42 and 51-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bunyan (US 6,054,198) in view of EP 0794,227 (herein referred to as Hill).

Bunyan teaches a thermally conductive interface for conductively cooling heat generating electronic components. The composition is interposable between the thermal interface of a heat source and a thermal dissipation member (col 4, lines 39+). The film may take the form of a tape with a release sheet (col 7, lines 33+) and is applied to the interface surface of the dissipation member (col 7, lines 61+). The

composition comprises 25-50wt% of a pressure sensitive adhesive, 50-75wt% of an olefinic material having a melting temperature of 50-60°C, and 20-80wt% of a thermally conductive filler (col 8, lines 16+). The adhesive may comprise an acrylic polymer (col 7, lines 30+). The olefinic low melt component may comprise a wax (col 9, lines 9+). The conductive filler may comprise boron nitride (col 9, lines 50+. The composition may further comprise a wetting agent, herein relied upon to read on the claimed surfactant (col 9, lines 59+).

Bunyan does not teach that the composition may comprise a surfactant. However, However, Hill teaches a thermoconductive composition comprising a boron nitride particle and a polymer base material (abstract). Hill teaches the composition should further comprise nonionic surfactants selected from the class of carboxylic acid amides and carboxylic acid esters (abstract) in order to provide the material with flow (page 1, lines 45+). The surfactant is included in amounts of greater than 1% (claim 1). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add more than 1wt% nonionic surfactants to the composition taught in the primary reference. The motivation for doing so would have been that nonionic surfactants improve the flow of thermoconductive compositions.

Further, it would have been obvious to utilize cocamide as the fatty acid amide because cocamide is a known fatty acid amide and glycerin is a known carboxylic acid ester. Said genus is small enough to anticipate the species included therein. Furthermore, cocamide is a known non-ionic surfactant.

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With regard to the claimed wetting angle of claims 50-52, it would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the amount of surfactant added to the thermal interface composition in order to obtain said wetting angle. Furthermore, the examiner takes the position that the claimed "thermal impedance of "less than or equal to 0.8x" is inherent to a composition with the claimed wetting angle since the surfactant insures homogeneous dispersion of the conductive particles.

Bunyan does not teach the claimed thermal impedance of claim 50. However, Bunyan teaches that the thermal conductance of the composition may be controlled by selecting filler loading concentration of the conductive particle (col 9, lines 35+). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the particle size, distribution and concentration in order to obtain the desired thermal impedance.

Response to Arguments

Applicant's arguments filed June 17, 2005 have been fully considered but are moot in view of the new grounds of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin R. Kruer whose telephone number is 571-272-1510. The examiner can normally be reached on Monday-Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on 571-272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kevin R. Kruer
Patent Examiner-Art Unit 1773